DOCUMENT RESUME

ED 429 550 IR 019 458

AUTHOR	Vieville, Claude; Hoogstoel, Frederic
TITLE	Organising Distance Learning Process Thanks to Asynchronous Structured Conversations.
PUB DATE	1997-11-00
NOTE	7p.; In: WebNet 97 World Conference of the WWW, Internet & Intranet Proceedings (2nd, Toronto, Canada, November 1-5, 1997); see IR 019 434. Figure may not reproduce clearly.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer Mediated Communication; *Computer System Design; *Cooperative Learning; Cooperative Programs; Distance Education; Foreign Countries; *Group Activities; Interaction; User Needs (Information); Users (Information); *World Wide Web
IDENTIFIERS	Design Methodology; Web Browsers

ABSTRACT

This paper describes a communication system accessible by a World Wide Web browser. The main advantage of this system is to encourage a collaborative way of learning using asynchronous communication channels. The conversation is strongly structured by the system itself which helps the users to coordinate their actions, playing their respective roles within a task. A conversation always occurs in the context of a task where each user plays a particular role. The system is built around the notion of active form, which is the single way for the user to communicate with the system. This system can be used by the actors of the educational process to organize their work. Globally, the basic services provided by this asynchronous communication system are informal exchanges, question-answer exchanges, date negotiation, pro-con argument production, action negotiation, and opinion collection. These basic services are enhanced by a subset of complementary services which are needed to manage, adapt, and integrate the system using existing communication tools to meet users' needs. A participative design approach has given the system a good degree of usability. Contains 19 references. (AEF)

Organising Distance Learning Process thanks to Asynchronous Structured Conversations

Claude Viéville
Frédéric Hoogstoël
email: {Claude.Vieville, Frederic.Hoogstoel}@univ-lille1.fr
Laboratoire TRIGONE
Université des Sciences et Technologies de Lille
Cité scientifique
59655 Villeneuve d'Ascq CEDEX, France

Abstract: This paper describes a communication system accessible by a Web browser. The main advantage of this system is to encourage a collaborative way of learning using asynchronous communication channels. The conversation is strongly structured by the system itself which helps the users to co-ordinate their actions playing their respective roles within a task. A conversation always occurs in the context of a task where each user plays a particular role. The system is built around the notion of active form which is the single way for the user to communicate with the system. This system can be used by the actors of the educative process to organise their work.

1 Introduction

This paper describes an asynchronous collaborative learning system which aims to support a distance education process on the Web. What attracts the Internet to an educational institute is a large communication network to exchange information in two ways, the on-line browser and the courseware package distribution. So the challenge we have to face is to change information exchanges into learning activities. For this reason, we are interested in second generation servers which respond better to educational needs : better interactivity between video-clip, text, images, and so on ; enabling re-use of all the supports we have developed in a fully integrated manner ; inclusion of graphics and formulae is compulsory for a lot of curricula ; embedded courseware corresponds with the multiplicity of training pathways for individualised training and the ease of navigation required. As a minimum requirement, the system needs communication facilities to enhance real collaboration between users and tutors. In the EONT project[1], in which we are participating, we are verifying these hypotheses. And in the DEMOS project[2] we are designing, developing the asynchronous communication system presented more precisely in this paper. To develop our system we distinguish three spaces in which the activities of learners take place : information space, action space and communication space. The communication space depends on the institute, and organises the interactivity between the different spaces to correspond to a pedagogical practice. After a short introduction of the application field, the paper presents the functional specification of the system we are currently testing.

2 Educational Context

The CUEEP (Centre Universite-Economie d'Education Permanente) is an institute of the University of Sciences and Technologies of Lille in northern France which is concerned with several activities: further education for

[1] An experiment in Open Distance Learning using New Technologies - part of the Socrates programme of the European Commission
[2] Distance Education and tutoring in heterogeneous teleMatics envirOnmentS - part of the Education and training programme of the European Commission

adults, research into educational engineering (open learning and new communication technologies), transfer within the context of new technologies in education. Some experiments of the co-operative system Co-learn had been set up during these two last years. Now we search to integrate this communication system into our distance education organisation. To continue our work of research into the use of tools of communication in distance education we are conducting a project to deliver course on the Web based on collaborative learning. This project is mainly supported by the European Commissions through the Telematics for Education programme. In this framework, we are setting an Asynchronous Collaborative Learning System in the DEMOS project. This system relies on a second generation of Web server (HyperWave from University of Graz - Austria).

3 Overview of the Services

This asynchronous communication system will provide a set of services from the same family as those already provided by electronic mail (email), electronic forums (forum), Bulletin Board Systems (BBS) and the News. Its ambition is to give users real help with their *tasks* by avoiding several well-known drawbacks of current systems [Terry 1991] and to propose a structuring of the conversation so that it is very efficient to communicate and collaborate via such a system [Vieville 1995]. The measurement of the efficiency of this system could be made upon the following :

- time-saved during the co-ordination phase of a collaborative process [Bussler and Joblonski 1994],
- time-saved when reading each others contributions,
- enhancement of the quality of arguments produced during a debate[Desaranno and Put 1994],
- better involvement of users in the collaborative processes.

The Co-Learn project is an important input to the specification of such a system. In [Derycke & al 1992], the interest of developing Collaborative Learning activities has been explained. It is outside the scope of this document to argue in favour of educational processes which are based on collaboration between learners and tutors. In [Kaye 1995] it is also written as a result of the Co-Learn project, that "*it might have been preferable to put emphasis on the Asynchronous Communication mode as the basic substrate for communication between learners and tutors... In this way the Asynchronous Communication Mode would provide the glue which would hold a course together, inter-linking the real-time sessions, and providing a forum for continuing discussion and collaboration after each of these sessions.*" The reader who is interested by this discussion will find pertinent papers on this subject in the reference section [Harasim 1993], [Henri and Rigault 1996], [Kirsche & al 1994]. Jonassen, in [Jonassen 1996], gives an excellent overview of the possibilities of Computer Mediated Communication (CMC) in educational process.

3.1 Basic Services

The ACLS offers a set of basic services enhanced by a subset of complementary services which are needed to manage, adapt and integrate the system using existing communication tools to meet users' needs [Palme 1992], [Palme 1993], [Turoff 1991]. Globally the basic services provided by this asynchronous communication system are:

- informal exchanges,
- question-answer exchanges,
- date negotiation [Woitass 1990],
- pro-con argument production,
- action negotiation [Rogers 1995]
- opinion collection.

Each of these services could involve people regardless of the context of a collaborative task, or be used in the framework of a task process involving the group. In this latter case the exchange is automatically classed as public, unless specifically defined as private. The task in which the communicators are involved in is very fundamental as it will define the context in which the exchange has occurred [Ellis and Wainer1994].In this

ACLS, electronic mail is not distinguished from electronic forums or news systems as a means of communicating between people. The ACLS provides an integrated view of exchanges whatever channel is used (i.e. email, forums, news, BBS etc.) [Benford & al 1992].

This basic service will allow the members to select, fill in, edit, and submit a form which will complete an exchange. Exchanges are linked to each other by a temporal relation. The creation of a new exchange is a particular case of the creation of a contribution which becomes the root of the exchange. The ACLS also proposes other complementary services to its basic services. These will be described in the following section.

3.2 Complementary Services

To encourage co-operation ACLS will provide a service which gives information on its *users*. The communication needed by users during the task process will be supported inside a *group activity*. The group activity is the context in which the *exchange* of a communication occur. One and only one organisational group is attached to a group activity. The exchanges of a communication are structured sets of contributions. Each exchange is regulated by a set of global rules pre-defined at the installation of the ACLS. This set of rules depends on the way people of the organisation work together [Vieville 1995]. Obviously default rules are proposed during the installation phase. To participate in a group activity a user needs to be added ; he then becomes a *member* of the group activity.

It is also possible task by task to create subgroups in which all the members play an identical role with regards to the aim of the task. For example, if a collaborative writing task is started, subgroups of "authors", "editors", "reviewers" are created by the initiator of the task. Belonging to a subgroup will give different rights to the objects in the ACLS. A search service is available for all the users who want to find any objects in the ACLS. Users, group activities, sub-groups, forms, exchanges and tasks are searched and displayed to the user of the search service. To start a search operation, the user must fill in fields of a search form. The user has to define in the form which criteria the search should use. It is possible to search on the attributes and/or the contents of any types of objects of the ACLS. Authorised users will use the administration service to create/modify attributes ; delete/archive/open/close user and group activities. This administration is done by filling in an administrative form. Users are added and removed from group activities by using the registration service. A subset of authorised users with appropriate rights will have access to this service. Registration is performed by filling out a registration form. Only when a group activity has appropriate parameters may a user register himself for that activity.

A service of notification allows members, who have subscribed, to be notified when something is appended to the group activity. Filling in a notification form is the proposed way to subscribe to the notification service. The notification service allows to the user to receive (or avoid reception of) the events generated inside the ACLS. The kinds of events are :

- "group activity" list has changed,
- list of users of the ACLS has changed,
- status of a group activity has changed,
- list of tasks for a particular group activity has changed,
- list of exchanges for particular tasks has changed,
- list of forms for a particular exchange has changed,
- a deadline relative to a task is going to arrive,
- a deadline relative to a task has been detected,
- a particular user activity has been detected,
- a particular group or subgroup activity has been detected.

The events are sent to the notification recipient which could be an electronic mail address, a news group, or another task of any other group activity.

4 Several Implementation Key Points

From the implementation point of view, ACLS relies on the architecture of an open system of CSCW called ODESCA[Hoogstoël 1995] which is built on the integration of an activity server using an object database for persistency with a WWW information server.

The access to the ACLS functions is realised by the way of the CGI mechanism of a web server. The CGI interface takes in charge the management of the transactions which is not supported by the web servers. This interface is also in charge of the management of the templates database of forms according the organisation and the users. Finally, it also communicates with ODESCA to obtain the conversation state, the list of types of templates allowed for a contribution and other functions less specific to asynchronous communication activities as the information on group members. This CGI application continuously updates a database where the interactions between users and ACLS are stored in order to give information to measure usability of the system. The data forwarding from the user station and CGI application is done according the HTTP protocol. This protocol does not support transaction by itself, so a mechanism has been designed to reject non valid request which has already been submitted. For example, we must avoid a user to submit the same form several times when he uses the moving back functionality of a web browser. A user thanks to a standard web browser of the Internet is able to get the list of the tasks in which he is involved in. Then, using the navigation functionality, he can get the list of the conversations of a selected task. Finally, he will get the list of the contribution of a particular conversation. A synthetic view of the state of the conversation remains always accessible as well as the set of the contents of all the contributions of a conversation [Fig 1].

Each time a user wishes to add a contribution at the heart of ACLS, the ODESCA server activates itself to propose him the list if the types of forms which are accessible. This list is computed by taking into account the state of the conversation in which the user wishes to converse, according to the role of the user and according to the kinds of the contributions he has already submitted. For example, in a conversation to define a date, the initiator of this conversation will receive from the ODESCA server a list of two forms : using the first one he will be able to convoke the persons at a date selected by the members of the group ; with the second one he will be able to announce the abort of the meeting for any reason. The submission of one or the other form will finish the current conversation. In this same conversation, all the other members of this group will receive from ODESCA a form in which he will indicate if the date is convenient for him.

ACLS makes a clear distinction between the presentation objects seen and manipulated by the user and the objects manipulated by itself. When a user creates a new object (i.e. new task, new conversation...) the system selects appropriate list of templates and the user has then to select one of these. Then, he has to fill the fields of this template. The templates is a HTML form controlled by javascripts. Javascript controls user input date for each field whose content is interpreted by the system. As the templates are semi-structured messages, some fields are not interpreted by the system but just stored and some other ones needs a strict control. Before being submitted a form which carry all the data of the template is locally controlled by a javascript. Designers of these templates encounters difficulties due to the lack of standardisation of javascript among browser. Netscape currently presents the most advance feature as it is able to manipulate HTML objects such as select object.

The current implementation takes in charge several parameters suitable for the organisations in which ACLS is used but also several other one suitable for the users. An organisation can select among an existing template database of forms but also edit its own database. The ACLS system uses HTML documents and proposes an extension which allows itself data on the flow according to the sate of the conversation or the role of the user. The edition can be done by anybody knowing a HTML editor and the meaning of the variables of the ACLS system. By using a modification process, it is very easy to realise a new templates database in another language. This option is also proposed for user by user. It can be used to reduce the complexity of a given set of information according to the skill of the users with the system. As the models are stored in the HTML format, a classic web browser such as Netscape Navigator or Microsoft Internet explorer can used to access to the ACLS system. This choice allows a large usage of the ACLS.

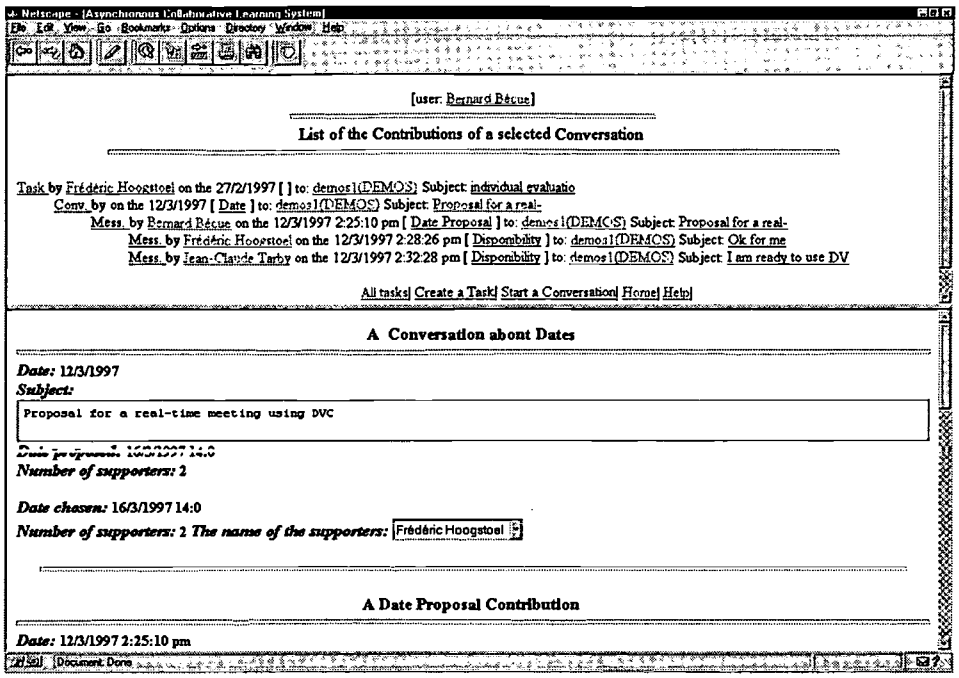

Figure 1: View of a Conversation to agree on a date

On the other hand, it remains possible to integrate the ACLS functionality at the heart of another application. As a matter of fact, It exist a templates set in a MIME format which offer a mean to implement a new interface less general than a web browser and so more adapted to a specific context of work. The implementation can be done in any language as ACLS interface is just a definition of a protocol. JAVA seems to be a good candidate to this implementation.

The notification mechanism which is in currently in test but soon available allows users to never consult the ACLS. They only have to let a email agent active on their station. This agent will receive a notification message coming from ACLS telling them what is new in ACLS for them. A backward link helps them to directly consult the task and the conversation which includes the major events.

5 Conclusion

A particular attention has been paid in the methodology of design in order to work with the user group. This system has been designed incrementally ; it means that, rapidly, with only a few functions it has been usable by the members of the user group who sent feedback to the designers. This participative approach has certainly given to this system a good level of usability. At the moment this paper is written, implementation of the first release of the prototype is finished and results of usability are soon available.

6 References

[Benford & al 1992] Benford S., Turroff M. and Palme J. (1992), An ISO standard to support asynchronous group communication. In: Computer Standards & Interfaces Elsevier Science Publishers B.V. (North-Holland); 14:363-373

[Bussler and Joblonski 1994] Bussler C. and Joblonski S. (1994), Implementing Agent Coordination for Workflow Management Systems Using Active Database Systems. IEEE software; 4:53-59

[Derycke & al 1992] Derycke A. and al. (1992), Representation Models for Collaborative Educational Situations and Collaborative Learning activities, Deliverable 4 of Co-Learn D2005

[Desaranno and Put 1994] Desaranno S. and Put F. (1994), Co-ordinating group communication. In: Computer networks and ISDN Systems, Elsevier Science B.V., pp S129-S138

[Ellis and Wainer1994] Ellis C. and Wainer J. (1994), Goal-based models of collaboration. In: Collaborative Computing, Chapman & Hall, pp 61-86

[Harasim 1993] Harasim L. (1993), Collaborating in Cyberspace : Using Computer Conferences as a Group Environment. Interactive Learning Environment; 3(2): 119-130

[Henri and Rigault 1994] Henri F. and Rigault C. (1994), Collaborative Distance Learning and Computer Conferencing In: Advanced Educational Technology: Research Issues and Future Potential (T.Liao ed.) NATO, ASI series, Springer Verlag , pp 45-76

[Hoogstoël 1995] Hoogstoël F. (1995), Une approche organisationnelle du travail coopératif assisté par ordinateur. Application au projet Co-Learn, thése de Doctorat en Informatique à l'université des Sciences et Technologies de Lille

[Jonassen 1996] Jonassen D. (1996), Computers in the classroom ; mindtools for critical thinking. Prentice Hall

[Kaye 1995] Kaye A. (1995), Final Evaluation Report, Synthesis of Co-Learn Trials and Experimentation, Deliverable 33 of Co-Learn d2005

[Kirsche & al 1994] Kirsche T., Lenz R., Ruf T. Wedekind H. (1994), Co-operative Problem Solving using Database Conversations. IEEE software; pp 134-143

[Malone 1987] Malone T. (1987), Semi-Structured messages are surprisingly useful for Computer-Supported Collaboration. ACM trans. On Office Information Systems; 5:115-131

[Palme 1992] Palme J. (1992), Computer Conferencing Functions and Standards. In: Collaborative Learning through computer conferencing, Kaye A.R., pp 225-245

[Palme 1993] Palme J. (1993), Standards for asynchronous group communication. Computer communication; 16-9:532-538

[Rogers 1995] Rogers (1995), The Use of an automatic "TO Do " list to Guide Structured Interaction.. In: Proceedings of CHI 95, Denver, Colorado, USA, pp 232-233

[Terry 1991] Terry D. (1991), 7 steps to a better mail system. In: Message handling Systems and Application Layer Communication Protocols, Elsevier Science Publishers B.V. (North-Holland), pp 23-33

[Turoff 1991] Turoff M. (1991), Computer-Mediated Communication Requirements for Group Support. Journal of Organizational Computing, 1:85-113

[Vieville 1995] Vieville C. (1995), Structuring conversation in asynchronous communication systems to support collaborative learning at a distance. In: Proceedings of ED-MEDIA 95, Graz, Austria, pp 816-817

[Woitass 1990] Woitass M. (1990), Coordination of Intelligent Office Agents Applied to Meeting Scheduling. In: Multi-User Interfaces and Applications, Elsevier Science Publishers B.V. (North-Holland), pp 371-387

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

REPRODUCTION BASIS

☒ This document is covered by a signed "Reproduction Release (Blanket) form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☐ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").